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NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program
Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 3, NUMBER 1

SPRING 1993

Program Faces Serious Budget Deficit

Donations to the Natural Heritage & Endangered Species Fund have decreased by almost one-fourth over the last two years; contributions on 1991 tax forms totalled only \$310,000. The Natural Heritage & Endangered Species Program (NHESP) receives 84% of its operating budget from this Fund and has received no support from the state's General Fund since 1987. This means that, without additional revenues, the Program's operating budget of about \$600,000 could be cut in half on July 1st.

Senator Durand (D-Marlborough) and Representative Angelo (D-Saugus) have filed a bill that would restore General Fund support to NHESP by providing a three-to-one match of General Fund revenue to money donated by the public to "Endangered Wildlife Conservation" on their tax forms. (See "Legislation" in News Notes on Page 7).



In March, Governor William Weld posed with a Peregrine Falcon to promote contributions to the Natural Heritage & Endangered Species Fund.

Over the past 9 years, your voluntary contributions have enabled the Natural Heritage & Endangered Species Program to restore the following rare species to Massachusetts:

Peregrine Falcon: nesting again for the first time since 1957.

Bald Eagle: nesting again in the state for the first time since 1905.

Osprey: made such a strong recovery it was removed from the state's rare species list.

Plymouth Redbelly Turtle: its population has doubled since captive-reared turtles began to be released back into their natural habitat.

As many of our readers know, the Program tracks the locations of endangered plants and animals, maintaining a data base that serves natural resource agencies and other organizations. By providing each town's conservation commission with information on rare wetlands wildlife in their town, the Program helps to protect critical wetland habitat under the state's Wetlands Protection Act. Also, because NHESP identifies lands that are critical to conserving biological diversity, 1200 acres of vital habitat have been purchased for protection over the last six years. The Program also certifies vernal pool habitats, thus providing these pools some protection under state wetlands regulations.

Your contributions have also enabled the Program to assess the potential impacts of over 1500 proposed development projects a year to safeguard rare species and their habitats as well as exemplary natural communities.

We need your help! Please mail in the form on Page 7 with your contribution, or call NHESP at (617) 727-9194 for more information.

- Sally Carroll

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What Smokey The Bear Didn't Tell Us About Forest Fires

Those of us who grew up watching Smokey the Bear tend to believe that no living thing benefits from forest fires; but more and more, land managers are recognizing the role a *planned* fire (prescribed burn) can play in maintaining certain types of natural communities.

Benefits of Fire

Now we know that there are good reasons for conducting prescribed burns; here are some:

- Reduces fuels to lessen the intensity of wildfires.
- Prepares the site for regeneration of groups of plants that would otherwise not flourish.
- Maintains habitat for certain wildlife species.
- Opens up habitat to a greater diversity of species.
- Controls certain insects and diseases.
- Reduces potential damage from uncontrolled fires.

Studies have shown that recently burned Pitch Pine/Scrub Oak barrens have a greater diversity of native species than unburned sites. This is because fire increases the rate of nutrient cycling in the soil, as organic material that is slow to decompose in dry soil releases its nutrients as ash after a fire. This results in new growth of plants and an increased variety of accompanying insects and birds. Some of this new growth is also due to plants that specialize in growing immediately after a fire or other land disturbance. Fire can also control plant diseases by regulating the population of forest insects and reducing microbes and plant infections.

In the past century, U.S. land managers attempted to suppress all forest fires because of the difficulty in stopping wildfires once they began and the resulting damage that they could cause. When fire is suppressed, the growing thickness of vegetation starts crowding out species that are adapted to more open areas, and to areas disturbed by fire.

History of Burning

Early Native Americans knew that when they burned the woods their berry crops and hunting would improve. Before European settlement, some areas of eastern Massachusetts burned regularly from lightning or ignition by Native Americans; these places tended to be open with less vegetation than areas like forests, which burned only occasionally. The resulting variety of vegetation provided habitat to many species of native animals and plants that were adapted to a particular vegetation and the natural community that it was a part of.

Fire in Massachusetts

Currently, regular fire management of Pitch Pine/Scrub Oak barrens and grasslands is necessary for the survival of native species populations in Massachusetts. In 1992, NHESP Ecologist Pat Swain assisted at about half of the 15 prescribed burns in Massachusetts, all totalling roughly 300 acres. Usually, a prescribed burn requires about half a day of physically demanding work by many trained volunteers, and a manned firetruck is present to provide water as a supplement to the portable backpack pumps carried by the burn crew.

On Martha's Vineyard, the habitats of rare moths and butterflies are being reopened through burning. Burning and opening grasslands maintains much-needed habitat of native plants like the Nantucket Shadbush and birds such as Northern Harriers and Short-eared Owls.

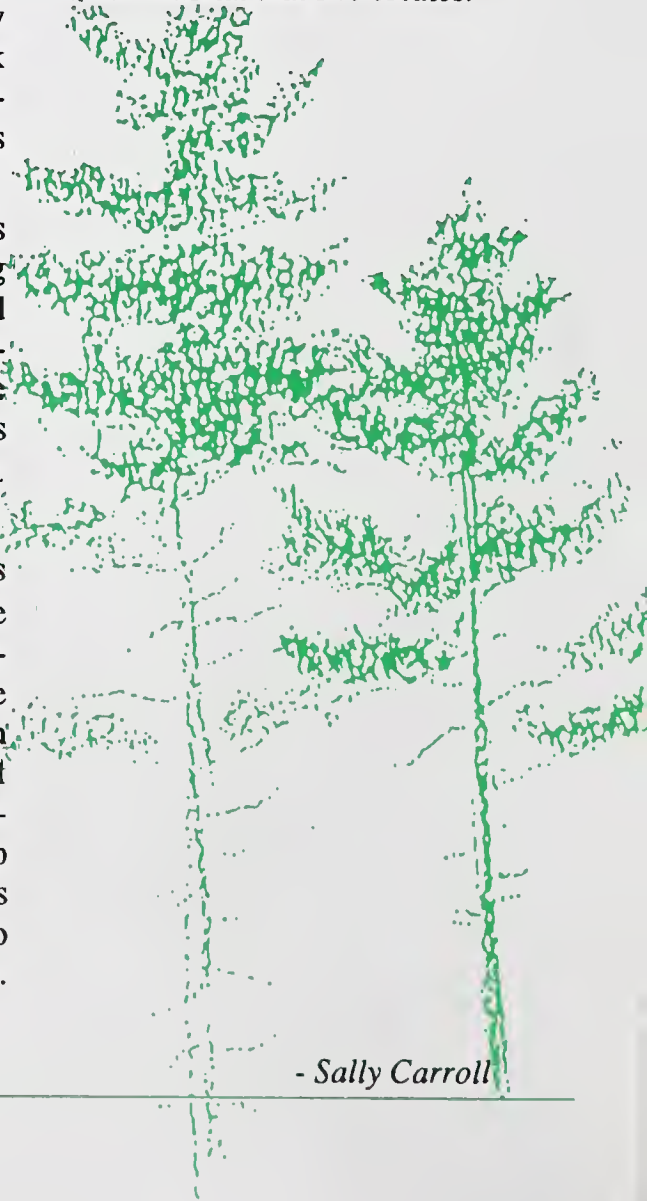
Fire Communities

Some plant communities, such as pinelands and grasslands, are fire-prone and thrive after a fire. Fire-prone vegetation and associated animals that all make up a natural community tend to occur in dry areas where there is a build-up of dead plant materials. Minerals and nutrients valuable to new growth are bound up in a thick layer of needles and oak leaves on the forest floor; this layer is slow to break down and prevents new growth.

Fire reduces this bed of needles and leaves and releases their nutrients, preparing an ideal seedbed for more new growth.

One natural community type that is both dependent on and maintained by fire is the Pitch Pine/Scrub Oak barrens, which is an open shrubland plant community with grassland or heathland in low areas. It is found on glacial sands which are acidic and prone to drought. Some of its species have volatile oils that encourage the spread of fires, and some pitch pines produce cones that only release their seeds when heated by fire. Member species like scrub oaks, huckleberries, and pitch pine have adapted to regrowing after occasional fires. In the grassy openings of these communities, the Birdfoot Violet is one of the first plants to appear after a fire, and the larvae of the Regal Fritillary, the rarest butterfly in Massachusetts, depend on this violet for food.

Although fire may displace some animals temporarily, it is clear that, in the long run, wildlife actually benefits from the new habitat that fire creates.



- Sally Carroll

Old-Growth Forests in Massachusetts

It is difficult for most residents today to imagine what Massachusetts looked like in 1830; so much of our original forest land was cleared for agricultural use and timber that most of the state was converted to fields and pasture. Now, after 160 years of re-growth, 64% of our landscape is forested, and most of these forests were seeded from pasture; thus, there is very little old-growth or "virgin" forest left in this state. The old-growth stands that remain, escaped logging either because they were inaccessible (located in steep-sloping, isolated valleys), were on land unfit for agricultural use, or lacked popular timber species like white pine, which was highly prized by early loggers.

For the past five years, old-growth forests have been the subject of national controversy since the logging of these forests in the Pacific northwest was found to interfere with the habitat of the Northern Spotted Owl, a federally endangered species. The likelihood that there are species of plants and animals in Massachusetts that, like the Spotted Owl, depend on old-growth forests for survival, underlines the importance of preserving the few stands of old-growth that we have left.

For the past two years, NHESP has funded a survey by Peter Dunwiddie, an ecologist with the Mass. Audubon Society, in which he identified 13 tracts of old-growth forest in the Berkshires ranging in size from about 10 to 70 acres each and totalling more than 300 acres. (In contrast, in New York's Adirondacks there are tracts of old growth in excess of 50,000 acres.) These stands are located in the towns of Florida, Monroe, Mount Washington, New Ashford, Savoy, and Williamstown, mainly in or near state reservations. They are dominated by Hemlock and Northern Hardwood forest types, mainly Beech, Sugar Maple, and Yellow Birch.

Besides being largely undisturbed by humans, a main characteristic of an old-growth forest is that dominant trees are at least half as old as their average life expectancy, and some trees should be approaching that life expectancy. To determine their ages, Peter measured the diameters of large trees and drilled core samples of chosen

ones. The radial cores were then mounted and sanded in a laboratory, and the growth rings were counted to estimate the trees' ages, one year for each ring. The core samples showed that all the plots contain trees between 200 and 225 years, and some of the hemlocks are over 400 years old--a lot of rings to count.

While some trees in our old-growth forests tower over 100 feet high, there should also be many smaller trees of all ages growing there, indicating that the forest is constantly reproducing itself and has a healthy, diverse structure. These forests should include standing dead trees ("snags") and downed, dead trees ("logs"). As canopy trees die, more light is let in which encourages the growth of smaller trees, while the dead trees provide food and habitat for wildlife.

Using your donations, NHESP is also helping to support a study this summer of bryophyte species (mosses and liverworts) by Sarah Cooper-Ellis, a graduate student in plant ecology at Smith College. The aim of this research is to find out whether any of these plants particularly depend on old-growth forest habitats for their survival in Massachusetts. Bryophytes can be valuable indicators of habitat quality and can help to stabilize soil for other plant species.

The value of old-growth forests is many-fold. Besides the intangible benefits of their pristine beauty, their unaltered gene pool makes them a museum of original seed stock of many wild species of plants. Like the Pacific Yew, a source of the cancer-fighting drug Taxol found in the old-growth forest of the northwest, there may be similar undiscovered benefits here in Massachusetts.

Old-growth forests are links to our natural past; analysis of tree rings, dead wood, and soil particles can be used to date severe storms and other climatic changes, fires, and insect outbreaks, as well as changes in air and water quality. Also, some of these trees were alive during the Civil War and the American Revolution, which makes them a part of our history.

-Sally Carroll

Natural Community Profile: Floodplain Forests

Floodplain forests develop next to rivers and streams that flood regularly in the spring. Undisturbed floodplain forests support a key part of the state's diversity of plants and animals, and protect the quality of water in adjacent streams. There are distinct vegetation and soil characteristics of floodplains.

Important Habitat

Low areas on the floodplain may stay wet longer than the rest of the area in the spring, forming vernal pools which are important breeding areas for salamanders, toads and frogs. Other areas such as oxbows (ponds in old stream channels) may remain wet throughout the growing season and support aquatic and emergent vegetation.

Seasonal flooding enriches the soil in floodplain forests with organic matter and silts from upstream so that nutrients are plentiful for plant growth, and many floodplain-adapted plants benefit from spring flooding.

Biodiversity

Diversity of floodplain animal life is enhanced by the variety of vegetation. Birds particularly respond to the mixed heights of the forest trees and shrubs. Some animal species move to floodplain areas from uplands during dry seasons; for example, deer move to floodplains to eat the plants before the upland foods are available later in the summer. Aquatic animals including fish use the flooded areas, getting extra nutrients from the flooded forest floor and a breeding area in the shallow flood waters; other animals including some birds and turtles use the floodplain forest both as a migration "corridor" through mountainous or otherwise difficult terrain and as a source of water while they travel.

Massachusetts

The best floodplain forests in Massachusetts occur along the Connecticut River and its tributaries, and the Housatonic and Merrimack Rivers. Davis's

NHESP is funding studies this summer that deal with 3 floodplain rarities in Massachusetts. One is Britton's Violet (*Viola brittoniana*), which is state-listed as Threatened. The known locations of this stemless blue violet are along trails in areas that the river floods every 10 to 100 years. In Massachusetts it is known from just 6 locations along the Concord and Neponset rivers. Research on this violet will again be carried out by botanist Dr. Sally Zielinski, who is also Executive Director of the Mass. Association of Conservation Commissions. NHESP is also granting funds to enable Laurie Sanders, a field naturalist, to locate and study populations of the rare Green Dragon plant and the Ostrich Fern Borer moth, both floodplain species along the Connecticut River.

Sedge, one of the rarest of New England plants, grows in the floodplain forest along the Housatonic River. Another floodplain forest is along the Three-mile River in Taunton. Dominant trees in the floodplain community are Silver Maple, Black Willow, Sycamore, Cottonwood, Box Elder Maple, and Green Ash, as was the American Elm before Dutch Elm disease reduced its population in the forests; also present are River Birch (Merrimack River), Pin Oak (Connecticut River), and Bur Oak (Housatonic River). In Massachusetts, most of these trees grow naturally only on floodplains.

In spring, perennial Ostrich Ferns grow up through inches of silt and annuals such as Jewelweed and Clearweed, and by midsummer an often continuous layer of nettles cover the ground. In less flooded areas, vines such as grape and Moonseed, shrubs such as wild blackberries, and perennial grasses may become common. Poison Ivy also does very well in floodplains. A few of the state's rare plants grow at the edge of the floodplain: Sandbar Willow and Frank's Love-Grass are found in the full sun of sandbars by the river; Green Dragon grows in the floodplain forest and in adjacent meadows, often near its relative Jack-in-the-Pulpit; and Winged Monkey-Flower can be found along some small tributary streams near the Connecticut River.

Threats

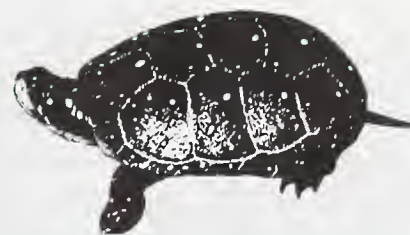
Within the northeastern United States, floodplain forests are no longer very extensive. The flatness and richness of the soils make floodplains ideal agricultural lands, and extensive areas of our floodplains have been converted for agricultural use. Some areas on floodplains became industrialized in the last two centuries, and some areas have reverted to town parklands or flood control areas.

One reason floodplains continue to be developed is that when they are altered, the resulting damage often occurs downstream. For example, when upstream floodplains are reduced in size, the water moves faster and cuts the banks more so that floods worsen downstream. The cumulative loss from 300 years of forest removal or development has had detrimental effects on whole watersheds and their plant and animal species.

- Sally Carroll

What is the Status of Our Spotted Turtles?

• Your donations are being used by NHESP to fund research through the Department of Forestry and Wildlife Management at UMass-Amherst into the population dynamics and habitat requirements of the Spotted Turtle. •



A man from Oxford reported one crawling up onto the beach. A Nantucket woman noticed one in a cranberry bog. In Middleboro, four were seen sunning themselves in a wet meadow. The Spotted Turtle (*Clemmys guttata*) is currently listed as a species of Special Concern in Massachusetts, but the rate of new sightings and the total number of observation records are higher than other species of state-listed wetlands wildlife. That is why the Division of Fisheries and Wildlife (DFW) is re-evaluating the status of the Spotted Turtle.

The DFW is reconsidering the status of the turtle because: (a) there have been a large number of recent documented observations in Massachusetts; (b) the turtle's habitat seems to be relatively abundant; and (c) about 20% of the Spotted Turtle occurrences are known to be on conservation land which provides them with protection.

Perhaps because of the Spotted Turtle's intolerance to pollution and to loss and degradation of its habitat, the state's population of these reptiles may have been declining since the early 1900's. Historic accounts have stated that the turtle was common in western Massachusetts, yet today Berkshire County has the fewest recorded Spotted Turtle observations of all Massachusetts counties except Suffolk.

The historic records are one reason why some people believe that de-listing the Spotted Turtle is inappropriate. Some herpetologists have challenged a few of the assumptions about the Spotted Turtle made by the DFW. They point out that most of the records are from eastern Massachusetts and almost half are from Plymouth and Bristol counties, representing less than half of all Massachusetts cities and towns. Additionally, most of the

records are of single live or dead turtles, thus they do not show evidence of breeding and may not represent viable populations. To be considered strong, a turtle population should perhaps have several hundred or more individuals, but evidence of populations this size is rare.

The people against de-listing also challenge the assumption by DFW that Spotted Turtles on conservation land are automatically protected from disturbance, claiming that overcollection, habitat degradation, highway mortality, and predation are also problems for these animals. **Before any recommendation on the Spotted Turtle is made, these questions need to be answered:**

- Have threats to the Spotted Turtle in Massachusetts been identified and do they no longer pose a serious problem? Those opposed to de-listing believe that DFW should have better data on the biology, reproduction and population status and trends of the Spotted Turtle before making a recommendation to de-list it.
- Are a large percentage of the known Spotted Turtle records part of viable populations which are either stable or increasing? One concern is that, as these turtles are rare in New York, Vermont, New Hampshire, and Maine, they may be declining all across the northern edge of their range.
- Do Spotted Turtles always occur where suitable habitat exists?

The shell of the adult Spotted Turtle is marked by scattered yellow spots, while the young have one spot on each large scute. Adults average about 3 to 4 inches long and can have a lifespan of over 40 years. These turtles are shy, and usually hide themselves in the mud of marshy meadows, bogs, and small ponds. They are most often seen in springtime, sunning themselves along the water's edge.

OBSERVATIONS REQUEST

The Natural Heritage & Endangered Species Program is seeking more information on the state's Spotted Turtle population. We would appreciate written reports on any sightings, including a map detailing the site where individuals were found, and photographs if possible.

VERNAL POOLS

A total of 387 vernal pools have now been certified by the Program. Spotted Turtles are known to utilize vernal pool habitats. These spring pools of fresh water support rich communities that may include wetland plants, frogs and toads, salamanders, turtles, newts, and fairy shrimp. Some of these species are totally dependent on vernal pools for survival. Many vernal pools have been filled for development, so certified pools are now regulated under the Wetlands Protection Act.

A book on vernal pools entitled *Spring Pool*, published by the New England Aquarium, is available at the Aquarium's gift shop for \$15.95. *Spring Pool* uses spectacular photographs to illustrate the diversity of life that is supported by vernal pools, and can be enjoyed by both children and adults. The Aquarium's teacher resource center will loan out *Spring Pool* to teachers free of charge, along with an accompanying video. The video can also be purchased directly from the center for \$22.00. For more information call Joel Rubin at (617) 973-6590.

- Sally Carroll

1993 STATE BOX SCORE
Massachusetts List of Endangered, Threatened
and Special Concern Species
 (as listed in 321 CMR 10.60, January 29, 1993)

Taxonomic Group	Endangered	Threatened	Special Concern	Listed Total	% of Native Species
MAMMALS (including 6 whales)	7 (7 Federal)	0	5	12	14%
BIRDS (breeding, not the Eskimo Curlew)	11 (4 Federal)	6 (1 Federal)	13	30	14%
REPTILES (including five sea turtles)	8 (4 Federal)	5 (2 Federal)	3	16	53%
AMPHIBIANS	0	2	4	6	29%
FISH (inland species only)	4 (1 Federal)	2	3	9	23%
INVERTEBRATE (non-marine only)	22 (2 Federal)	17 (2 Federal)	54	93	N/A
PLANTS (vascular)	115 (3 Federal)	81	54	250	14%
TOTALS	167 (21 Federal)	113 (5 Federal)	136	416	15%*

* Total percentage excludes invertebrates since even a rough number of native invertebrate species in the state is not known.
Federal: Species also listed by the U.S. Fish & Wildlife Service as Federally Endangered or Threatened as of January 1993.

"...The smallest, still uncensused invertebrates, algae, and fungi, the invisible players that make up the foundation of the ecosystem." (Biologist E.O. Wilson, from his book *The Diversity of Life*.)

Continuing to recognize the ecological importance of invertebrate species, the Division of Fisheries & Wildlife added four invertebrate animals to the state's list of Endangered, Threatened, and Special Concern Species, while one species was de-listed.

Endangered

The **Sunderland Spring Planarian** (*Polycelis remota*) is now listed as Endangered in Massachusetts. This flatworm is known from only one site in the world. Currently, it is found at a cold spring on a state fish hatchery property. It is easily distinguished from other flatworms by the several small eyes arranged along the rear half of its body. It is dark in color and reaches about 3/8 of an inch in length. This species is globally restricted and has been listed because of its extreme rarity.

Threatened

The **Arrow Clubtail** (*Stylurus spini-ceps*) was rediscovered along the Connecticut River. This dragonfly is widely distributed in eastern North America but the Massachusetts population that used to exist along the Merrimack River has apparently disappeared due to industrial pollution and construction of dams.

Special Concern

The **Smooth Branched Sponge** (*Spongilla aspinosa*) is now listed as a species of Special Concern in Massachusetts. It is one of the rarest and least known freshwater sponge species in North America. Since 1880 it has only been found in seven other states besides Massachusetts. In this state, it is known from only two ponds.

The **New England Siltsnail** (*Cincin-*

natia winkleyi) has also been listed as a species of Special Concern in this state. This snail has been verified in only five Massachusetts locations: in the Merrimack and Artichoke rivers in West Newbury, the Egypt River in Ipswich, a drainage ditch in Rowley, and the Mill River in Newbury. It is found in slightly salty or fresh water. This species could be in danger from runoff of polluted water.

De-listed

The **Pink-edged Sulphur** (*Colias interior*) has been removed from the state list of species of Special Concern. This butterfly is characteristic of acidic heaths, barrens and bogs and is considered secure in most of Maine and New Hampshire as well as globally. It had been recorded in four Mass. counties and in 1986 was state-listed; since then, it has been determined not to be part of the state's native wildlife.

- Sally Carroll

NEWS NOTES

EAGLE NUMBERS UP FROM 1992

70 Bald Eagles were recorded in the state in early January, a 25% increase over last year's count of 56 eagles. This year marks the highest documented number of wintering eagles in the state.



IN CASE OF AN OIL SPILL...

Our Program has produced maps for the U.S. Coast Guard and the National Oceanic and Atmospheric Administration (NOAA) delineating where listed species and waterfowl need to be protected in the event of an oil spill off Massachusetts shores. Under the federal Oil Pollution Act of 1990, all states are required to have an oil spill contingency plan. The plan is expected to be in place July 1st.

PUBLICATIONS

NHESP has published an *Atlas of Priority Habitats* of rare wildlife, plants, and exemplary natural communities. This atlas includes the highest priority wildlife and plant habitats, both uplands and wetlands. This atlas is in addition to the *Atlas of Estimated Habitats of Rare Wetlands Wildlife* annually produced by the Program, that refers to animal, but not plant, species. These atlases can be purchased for \$35 each.

NEWS NOTES

SUPERMAN SUPPORTS
ENDANGERED SPECIES FUND

Actor Christopher Reeve, who is well-known for playing Superman, made a 30-second TV spot endorsing the Natural Heritage & Endangered Species Fund. We thank Mr. Reeve, a part-time resident of Berkshire County, for donating his valuable time and talent to our Program.

OUR THANKS : to The Nature Conservancy, Mass. Audubon Society, and Mass. Association of Conservation Commissions for running columns on the Natural Heritage & Endangered Species Program and our funding needs in recent issues of their newsletters.

LEGISLATION

The matching contributions bill (H4707) proposed by Senator Durand and Representative Angelo would provide critical operating revenue to our Program and help encourage voluntary contributions. As this newsletter goes to press, the bill is currently being reviewed by the House Ways and Means Committee.

A separate bill (S1014) filed by Senator Durand and Representative Resor (D-Acton) creates a special endangered species license plate. At \$25 a plate, this would generate a little revenue for the Program while promoting the Natural Heritage & Endangered Species Fund. This bill is in the Committee on Public Safety.

- Sally Carroll



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SOME OF THIS YEAR'S SMALL RESEARCH CONTRACTS

This field season, the Program is helping to support over 30 research and inventory projects.
Here is a sampling.

Yellow Lampmussel, Connecticut River
Puritan Tiger Beetle, Connecticut River Valley
Northeastern Beach Tiger Beetle population & habitat
Status of Elderberry Long-Horned Beetle in Concord
Taxonomic status of Nantucket Shadblow
Ostrich Fern Borer moth in western Mass.
Lichen analysis at Myles Standish State Forest
Genetic diversity of state rare plant species
Broad Tinker's-Weed on Cape Cod & the Islands
Inventory of natural communities, Connecticut River
Pitch Pine/Oak communities, Central New England

Blanding's Turtle radiotelemetry
Spotted Turtle radiotelemetry, Nantucket
Roseate Tern demographic studies
Piping Plover breeding biology, Bristol County
Wood Turtle radiotelemetry, Scantic River
Aquatic insect inventory
American Burying Beetle survey, Nantucket
Invertebrate inventory, Southwestern Mass.
Potinus firefly survey, Middlesex County
Dragonfly/damselfly survey, Plymouth County
Butterfly/moth survey, Atlantic White Cedar Swamps

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